APPENDIX A

EPA/ROD/R05-00/088
2000

EPA Superfund
Record of Decision:

MIG/DEWANE LANDFILL
EPA ID: ILD980497788
OU 01
BELVIDERE, IL
03/31/2000

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

MAR 31, 2000

REPLY TO THE ATTENTION OF

SR-6J

Thomas V. Skinner, Director
Illinois Environmental Protection Agency
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276

Re: MIG/DeWane Landfill Superfund Site -- Belvidere, Illinois
Region V Concurrence on Record of Decision

Dear Mr. Skinner:

The U. S. Environmental Protection Agency (U. S. EPA) has reviewed the Record of Decision (ROD) prepared by the Illinois Environmental Protection Agency (IEPA) for the subject site. Region V hereby concurs with the IEPA that the selection of Alternative 4A, a multi-layer cap, with active and passive management of landfill gas, the installation of a localized leachate collection system, the removal of leachate and sediments from the leachate surface impoundment, institutional controls, and the monitored natural attenuation of groundwater, is the most appropriate remedy for the MIG/DeWane Landfill Superfund Site in Belvidere, Illinois.

U S. EPA appreciates the efforts of Rick Lanham of your staff in preparing this ROD. Please feel free to contact me if you have any questions.

Sincerely,

William E. Muno, Director
Superfund Division

bcc: Richard Clarizio, ORC

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

MIG/DeWane Landfill
Belvidere, Illinois

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the MIG/DeWane Landfill ("the Site") in Boone County, Illinois. This remedial action was chosen in accordance with the Illinois Environmental Protection Act, 415 ILCS 5/1 et seq.; the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA"), as amended, 42 U.S.C. 9601 et seq. by the Superfund Amendments and Reauthorization Act of 1986 ("SARA"); and the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 C.F.R. Part 300. This decision document explains the factual and legal basis for selecting the final remedy for this Site. The decisions contained herein are based on information contained in the Administrative Record for this Site. The United States Environmental Protection Agency ("U.S. EPA") has expressed a willingness to concur with the selected remedy. The letter of concurrence will be added to the Administrative Record.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the site, if not addressed by implementing the response action selected in this Record of Decision ("ROD"), may present an imminent and substantial endangerment to the public health, welfare, or the environment.

DESCRIPTION OF THE REMEDY

The remedial action contained in the ROD will be a final Site-wide remedy. The selected remedial action addresses the major threats posed by the Site. The remedial actions include the containment of the landfill wastes by the installation of a multi-layer cap, the active and passive management of landfill gas, the installation of a localized leachate collection system, the removal of leachate and sediments from the leachate surface impoundment, and the monitored natural attenuation of groundwater. The final remedy builds on previously implemented interim response

actions, and emergency response and removal actions. These actions include: an interim cap, pumping down of the leachate surface impoundment liquids, and the recent installation of a landfill gas interceptor trench and gas extraction system in the area adjacent to the west side of the landfill. The final remedy selected for the Site incorporates both the long-term monitoring and operation and maintenance of these components, as well as other response actions. The function of these actions is to properly close the landfill and surface impoundment, to control the migration of landfill contaminants to the groundwater and other media (especially landfill gas emissions), and to reduce the risks associated with any possible exposure to contaminated materials. This remedy is intended to be the final action for the site, and addresses all contaminated media: contaminated soil, sediment, groundwater, landfill wastes, leachate generation, and the emission of landfill gases.

Specifically the Illinois Environmental Protection Agency ("Illinois EPA") has determined that the following measures should be implemented as the long-term remedy in order to fully address all threats to human health and the environment posed by contamination at the Site:

- Institutional controls in the form of future land-use and groundwater use restrictions for the landfill Site and areas west and north of the Site;

- Closure of the surface impoundment through the removal of all leachate liquids for off-site treatment and disposal;

- Excavation and consolidation of leachate surface impoundment sediments under a new multi-layer landfill cap;

- Construction of a new multi-layer landfill cap to cover and contain landfill wastes, minimizing the infiltration of precipitation to reduce leachate generation;

- Monitored natural attenuation of groundwater to attain groundwater chemical-specific ARARs (i.e., Illinois Class I groundwater quality criteria) and long-term groundwater monitoring;

- Leachate monitoring of hydrostatic conditions within the landfill interior and off-site landfill gas monitoring to the west of the Site;

- The continued operation, maintenance, monitoring and evaluation of the gas collection system. This system is comprised of extraction wells and a gas interceptor trench (installed and operating since May 1999), located west of the landfill and designed to meet the ARAR standards and be protective of the residential homes located west of the soil borrow pit area. This portion of the remedy will be operated in the active mode until such time as it can be demonstrated by offsite monitoring and data evaluation efforts that landfill gas migration no longer poses a concern to potential residential exposure points

or an exceedence of ARAR standards;

- Enhancement of the present gas collection system with passive gas extraction wells to be located within the interior of the landfill;

- Active leachate removal using the existing leachate removal system that underlies the eastern portion of the landfill Site and a system of either permeable bed layers or side slope drainage trenches, with the potential for contingent leachate removal upgrade options, constructed in major seep areas along the northern and western portions of the landfill, will occur and be subject to further study, and evaluation of hydrostatic conditions during the Pre-Design phase;

- Off-site treatment of collected leachate by direct discharge to POTW or alternative commercial disposal facility (on-site pretreatment may be required to meet applicable POTW effluent criteria);

- Construction of a surface water diversion system along the landfill side slopes, which may include drainage ditches around portions of the toe of the landfill, where feasible, and corresponding discharge routes (including necessary erosion control measures, structures, etc.).

DECLARATION of STATUTORY DETERMINATIONS

The Selected Remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action (unless justified by a waiver), is cost effective, and utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. The remedy partially satisfies the statutory preference for treatment as a principal element of the remedy. Treatment is not considered to be practicable for all the landfill waste due to the large volume and heterogeneous distribution of waste at the Site. Leachate, however, will be treated.

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

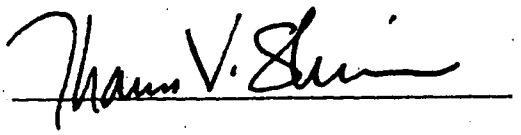
It is the considered opinion of the Illinois Environmental Protection Agency (Illinois EPA), in consultation with USEPA Region V, that the selected remedy is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate for this remedial action (or invokes an appropriate waiver), is cost-effective, and utilizes permanent solutions and alternative treatment technologies (or resource recovery) to the maximum extent practicable and satisfies the statutory preference for remedies that employ

treatment that reduces toxicity, mobility, or volume as a principal element. Because this remedy will result in hazardous substances remaining on-site above levels that will allow for unlimited use and unrestricted-exposure, a statutory review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be protective of human health and the environment.

ROD DATA CERTIFICATION CHECK LIST

The following information is included in the Decision Summary section of this Record of Decision. Additional information can be found in the Administrative Record for this site.

- Chemicals of concern and their respective concentrations.
- Baseline risk represented by the chemicals of concern.
- Cleanup levels established for chemicals of concern and the basis for these levels.
- How sources materials constituting principal threats are addressed.
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD.
- Potential land and groundwater use that will be available at the site as a result of the Selected Remedy.
- Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected.
- Key factor(s) that led to selecting the remedy (i.e., describe how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision.)



3/30/00

Thomas V. Skinner, Director
Illinois Environmental Protection Agency

Date

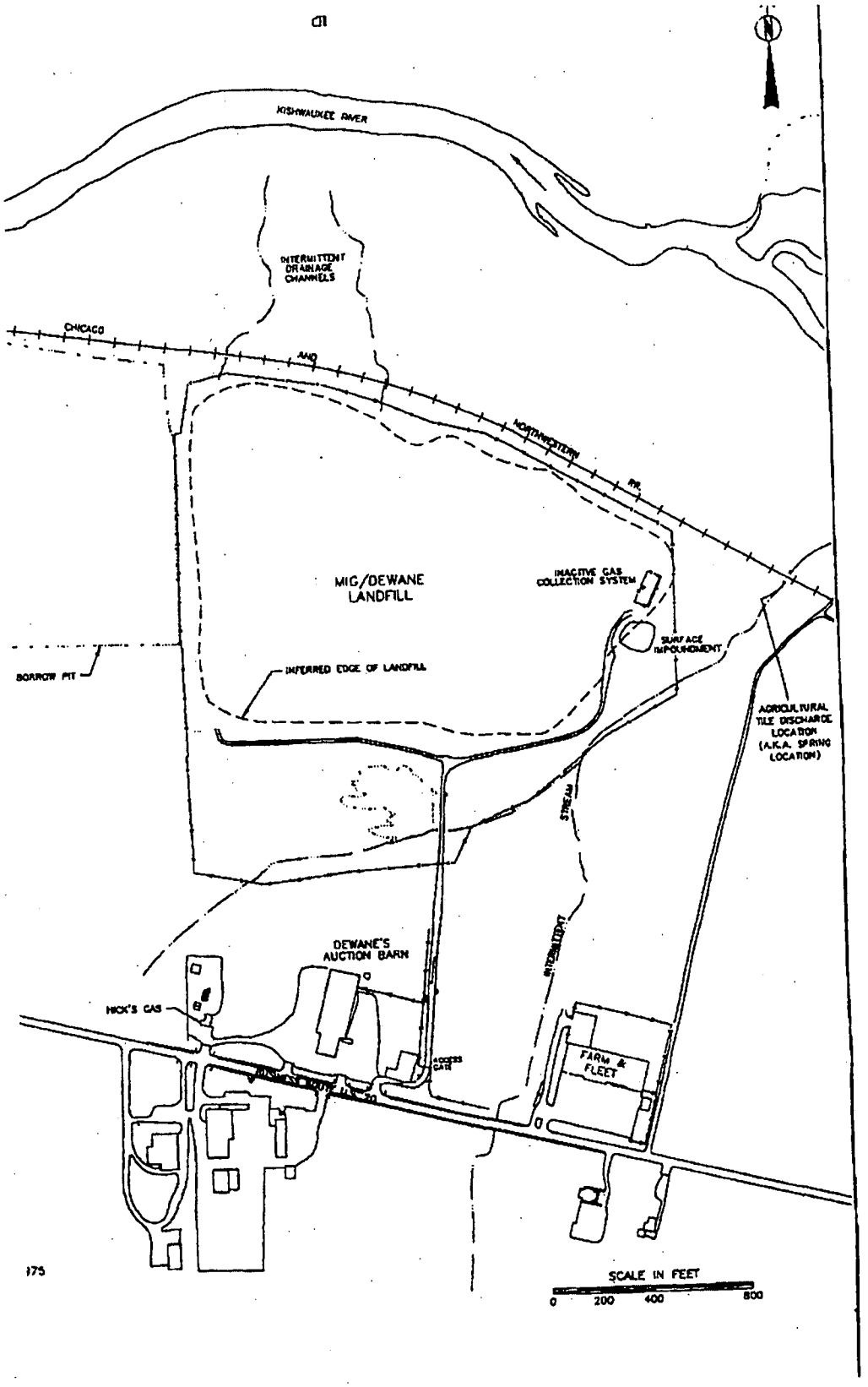
RECORD OF DECISION

for

MIG/DeWane Landfill

I. Site Name, Location and Description

The MIG/DeWane Landfill, also known as Boone Landfill, Bonus Landfill, or Rermedy Landfill is located in Boone County, Illinois approximately 0.25 miles east of the City of Belvidere and 0.5 miles north of Business United States (U.S.) Route 20. The landfill is located primarily in the south half of the southeastern quarter of Section 30, Township 44 North, Range 4 East. A map is provided below for reference.


KISHWAUKEE RIVER
INTERMITTENT DRAINAGE CHANNELS
CHICAGO AND NORTHWESTERN RR.
MIG/DEWANE LANDFILL
INACTIVE GAS COLLECTION SYSTEM
SURFACE IMPOUNDMENT
BORROW PIT
INFERRED EDGE OF LANDFILL
AGRICULTURAL TILE DISCHARGE LOCATION (A.K.A. SPRING LOCATION)
STREAM
INTERMITTENT
DEWANE'S AUCTION BARN
HICK'S GAS
ACCESS GATE
FARM & FLEET
175
SCALE IN FEET
0 200 400 800

The MIG/DeWane Landfill Site occupies an area of approximately 47 acres and rises to a height of approximately 50 to 55 feet above the surrounding terrain. The Site consists of a landfill and a leachate surface impoundment. The surface impoundment was constructed to receive leachate from the landfill's gravity flow, leachate collection system. The Site is bounded on the north by the Chicago and Northwestern railroad tracks and the Commonwealth Edison right-of-way. Agricultural and commercial properties are located to the east and south of the landfill. A soil borrow pit, used to provide soil for the landfill's interim cap, is immediately adjacent to the west of the landfill. Further west of the landfill is a housing development. North of the railroad tracks is an agricultural field that extends to the Kishwaukee River.

The Site contains a municipal landfill that received residential, municipal, commercial, and industrial wastes for disposal. The MIG/DeWane landfill is classified as a Type I landfill. A Type I landfill is a co-disposal facility where hazardous wastes were disposed of with municipal solid wastes. At these types of landfills, discrete "hot spots" are neither known nor suspected to be present. Hot spots consist of highly toxic and/or highly mobile material, and present a potential principal threat to human health and the environment. There are no known or suspected hot spots at the MIG/Wane landfill. A type I landfill also has the presence of hazardous constituents in the groundwater.

A Remedial Investigation and Feasibility Study ("RI/FS") was conducted at the MIG/DeWane Landfill site ("Site") under an Administrative Order by Consent ("AOC" or Consent Order") which was signed on May 29, 1991. This Consent Order was signed by the United States Environmental Protection Agency ("U.S. EPA"), the Illinois Environmental Protection Agency ("Illinois EPA"), and numerous Potentially Responsible Parties ("PRPs"). The RI/FS was conducted by the PRPs, with oversight by the Illinois EPA and U.S. EPA, and was completed in February 1999. During the RI/FS, the U.S. EPA was the lead agency for the enforcement related activities associated with the Site and the Illinois EPA was lead agency for overseeing the technical activities.

It is anticipated that the PRPs will be conducting and funding the remedial actions. They have already undertaken interim remedial actions prior to the RI. Also, after the completion of the RI/FS, due to emergency situation resulting from off-site landfill gas migration, they installed an active landfill gas interceptor trench and gas extraction system. The Illinois EPA provided oversight of all previous remedial action activities, and will continue to do so for the future Final remediation activities.

The objectives of the RI and FS were to determine what contamination may be occurring due to the landfill wastes, to evaluate alternatives for addressing the threats or potential threats posed by the Site's contamination, and to identify, develop, and evaluate cleanup alternatives appropriate for the Site. The preferred remedial alternative for this Site is alternative 4A, which in general is a compromise between alternative 4 and 5. The 4A alternative was chosen because it is the best alternative that meets the CERCLA requirements. It is protective of human health and the environment, complies with the applicable requirements as well as the relevant and appropriate

requirements (ARARs), and is considered to be the best balance of the 9 evaluation criteria for the remedial alternatives.

II. Site History and Enforcement Activities

Site History

The MIG/DeWane (MIG) Landfill operated from 1969 until 1988. The landfill was permitted to receive residential, municipal, commercial and industrial wastes. With the enactment of the Resource Conservation and Recovery Act (RCRA) regulations in 1980/82, however, the wastes received by the landfill were later restricted to nonhazardous. The landfill activities (or lack thereof) that lead to the current problems at the landfill include the disposal of various types of wastes as well as the improper covering of the landfill wastes.

From at least 1968 to 1983, the landfill property was owned by Mr. Raymond DeWane and Ms. Jean Farina (and, until his death, Mr. John L. DeWane). In 1983, the property ownership was transferred to a Trust. In 1991, ownership of the property was transferred to L.A.E., directly. Raymond E. DeWane and Jean A. Farina are the sole L.A.E. shareholders.

Prior to 1969 and until the early 1970's, a gravel pit operated out of the northeastern part of the landfill site, in an area of from 5 to 10 acres. A 1966 aerial photograph documents that the northwest and southern portions of the landfill site consisted of agricultural fields, while the northeast quarter of the landfill contained generally disturbed soil with pockets of excavated soil due to a gravel pit operation. The USGS 7.5 minute series 1970 topographical map of Belvidere North Quadrangle (USGS, 1970) indicates that the northwest and southern portions of the landfill consisted of agricultural fields, while the northeast quarter of the landfill consisted of a gravel pit. The topographical contours suggest that the gravel pit covered approximately 5 to 10 acres with a minimum basal elevation of somewhere between 770 to 780 feet mean sea level (msl).

From 1969 to 1988, the landfill site property was leased by various individuals and companies, including: Mr. Jerome Kennedy, Mr. J.D. Mollendorf; Boone Landfill, Inc.; Boone Disposal Co.; Bonus Landfill Co.; Rockford Disposal Service, Inc.; National Disposal Service; Browning-Ferris Industries of Rockford, Inc.; Browning-Ferris Industries of Illinois; and M.I.G. Investments. In that time the property was operated as a landfill by these entities.

In February 1969, the landfill was registered with the State of Illinois and disposal operations began in the gravel pit. The State of Illinois landfill permits required the placement of a five-foot compacted clay liner across the bottom of the pit, and vertically along the sidewalls. Wastes received were to be disposed of into the clay lined area, compacted, and covered with soil to form a cell. Each daily cell was to be covered by six inches of soil. These and other permit

requirements were required in an effort to protect the underlying groundwater from contamination by the waste disposal. Groundwater monitoring wells were installed at various times and locations.

In 1975, a gravitational flow leachate collection system was completed in the area that now comprises the eastern 1/3 of the landfill. The system allowed landfill leachate to be collected and drained through gravitational flow into a clay lined leachate collection lagoon or impoundment which measured approximately 130 ft, by 130 ft, by 10 ft deep.

In 1984, an U.S. EPA contractor conducted a sampling inspection of the landfill. The sampling inspection was conducted to provide information for evaluating the site for Superfund consideration.

In 1985, the State of Illinois filed a complaint against the landfill operating company, M.I.G. Investments, for violating their landfill-operating permit. The complaint alleged that the landfill operators had violated their permit by allowing the top of the landfill to exceed, by more than 20 feet, the maximum elevation allowed in the operating permit.

The results of the 1984 sampling were used in the U.S. EPA's November 20, 1986 final report evaluation and Hazardous Ranking Scoring (HRS) of the landfill. The evaluation, based on the sampling inspection results and Site history, determined that the landfill leachate was apparently contaminating groundwater, soil, sediments, and noted potential exposure pathways for the contaminants via direct contact, surface water, and groundwater.

In June 1988, a court ordered injunction was issued against M.I.G. Investments for being in violation of the requirements of their landfill operating permit. The injunction required the landfill operators to cease landfill operations. However, the injunction did not affect the need for the owners to meet all the other numerous permit requirements and landfill regulations, such as providing adequate landfill cover material, nor did it affect any necessary landfill closure requirements. The landfill ceased operations in June 1988. However, the landfill operators abandoned it in July 1988 instead of closing the landfill as required by the State of Illinois regulations.

In 1989, based upon the 1984 sampling inspection results, the 1986 evaluation and the HRS, the Site was proposed for inclusion on the National Priorities List (NPL). This is a list identifying sites throughout the U.S. that are eligible for study and cleanup, if necessary, under the Superfund program.

On August 30, 1990 the landfill site was placed on the NPL. Also, on October 29, 1990 the U.S. EPA and a previous operator, Browning-Ferris, Inc. (BFI) entered into a Administrative Order on Consent (Consent Order) for BFI to properly maintain the leachate surface impoundment by repairing and raising the height of the earthen berms, and reducing the level of leachate waters to insure that they do not over flow the impoundment.

In October 1990, the U.S. EPA began sending out Informational Request Letters pursuant to Section 104 (e) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) to potentially responsible parties.

On December 19, 1990, the U.S. EPA sent out special notice letters to numerous parties informing them of their potential liability with respect to the MIG/DeWane Site and offering them the opportunity to perform a Remedial Investigation/Feasibility Study (RI/FS). The responding parties formed a potentially responsible party group called "The MIG/DeWane Landfill Task Force" (MLTF). These PRPs are the respondents in the Administrative Order on Consent (Consent Order) dated March 29, 1991. The Consent Order was signed by the various respondents, the Illinois EPA, and the U.S. EPA. These PRPs agreed to conduct a RI/FS. Additional respondents signed onto the Consent Order at later dates. The dates when additional PRPs signed onto the Consent Order include December 18, 1991, April 28, 1993, and August 2, 1995.

During March 1997, the final Baseline Risk Assessment report was completed. The final RI Report was completed in July 1997.

In February 1999, the final FS that discusses and compares the potential clean-up remedial alternatives was completed. Early in 1999 gas probes were installed along the western soil borrow pit area boundary. In late April and early May 1999, extraction wells and an interceptor trench were installed and activated to remove landfill gas migrating offsite. Also, gas and groundwater sampling probes were installed in the Wycliffe subdivision. Gas extraction system and gas probe sampling continued throughout 1999, and continues today.

Sampling for VOCs in groundwater from the soil borrow pit and within the subdivision occurred in February 2000. An addendum to the baseline risk assessment will be based on the sampling results from 1999 and 2000. If the baseline risk assessment addendum determines that an unacceptable risk exists for the residents within the Wycliffe subdivision, then the remediation upgrade contingencies will be re-evaluated to insure that human health and the environment will be adequately protected.

III. Community Participation

The Illinois EPA has taken the lead role in conducting a community relations program for the site. At times the U.S. EPA had provided assistance. Concern about the site has remained somewhat high, with public concern directed mainly to the presence of landfill gas in the proximity of their homes on site rather than the presence of on-site chemical contaminants. A Community Relations Plan (CRP) was developed and issued in March 1993, and a public information meeting was held at the Ida Public Library to address community concerns at the

site.

The Illinois EPA has established an information repository for the MIG/DeWane Landfill at the Ida Public Library in Belvidere, Illinois. Site investigation documents, site related decision documents, the Administrative Record, and the Proposed Plan were placed in the repository. Copies of the Proposed Plan were mailed to interested citizens and groups and were available at the public hearing.

It was determined in late March 1999, that landfill gas had migrated over 750 ft. into a newly developing subdivision. Methane gas was infiltrating homes through basement sump pits and resulted in the recommended the evacuation of several homes. A series of public meetings were held to inform the public of the situation.

A public comment period for the Proposed Plan was held from June 10, 1999 through August 13, 1999 to encourage public participation in the overall remedy selection process. Several requests were received from individuals or groups for an extension. All requested extensions were granted and comments from those parties were due August 27, 1999. The Proposed Plan was released on July 13, 1999. Also, a public hearing for the Proposed Plan was held on July 13, 1999. At this meeting, representatives from the Illinois EPA answered questions about problems at the site and the remedial alternatives under consideration. Several requests were received from individuals or groups for an extension. All requested extensions were granted and comments from those parties were due Friday, August 27, 1999. A response to the comments received during this comment period is included in the Responsiveness Summary, which is part of this Record of Decision.

IV. Scope and Role of Response Action

Presumptive Remedies for CERLCA Municipal Landfills

Since CERCLA/Superfund's inception in 1980, the removal and remedial programs have found that certain categories of sites have similar characteristics, such as types of contaminants present, past industrial use, or environmental media affected. Based on a wealth of information acquired from evaluating and cleaning these sites, Superfund undertook the presumptive remedy initiative to develop remedies that are appropriate for specific site types and/or contaminants. One site category for which the U.S. EPA developed a presumptive remedy is municipal landfills. The U.S. EPA established containment as the presumptive remedy for landfills in September 1993. The containment presumptive remedy includes the following components, as appropriate in a site-specific basis:

- Landfill cap;
- Source area ground-water control to contain plume;

- Leachate collection and treatment;
- Landfill gas collection and treatment;
- Institutional controls to supplement engineering controls.

The overall strategy for cleaning up this Site included a combination of early emergency removal actions conducted under the 1990 AOC, along with interim remedial measures conducted under the 1991 AOC, the recent 1999 emergency response actions, coupled with the final, long-term actions described in this ROD. This strategy is consistent with the presumptive remedies approach identified by the U.S. EPA for municipal landfills.

Early Emergency Removal Actions

In May 1989, the Illinois EPA directed the emergency removal of approximately 80,000 gallons of leachate from the leachate surface impoundment. This action was implemented under State removal authority. This action and later leachate removal actions stopped the leachate from overflowing the impoundment and contaminating property both on-site and off-site. These actions also stopped the leachate from potentially contaminating adjacent intermittent streams and the Kishwaukee River.

In June 1990, the USEPA, after a request from the Illinois EPA, undertook the removal of approximately 75,000 additional gallons of leachate from the surface impoundment. This action was implemented under Federal removal authority.

The leachate surface impoundment berms were repaired and increased in height in November 1990, as was required by the October 29, 1990 Consent Order. This action was undertaken to insure the leachate did not overflow the impoundment and contaminate soil and surface waters.

Interim Remedial Measures

During 1991, the PRPs conducted interim remedial measures to stabilize the Site and mitigate the more than 100 leachate flows coming from the landfill. The measures included:

(1) Backfill and rough grading of the top and side slopes of the landfill to cover exposed refuse and allow for precipitation runoff;

(2) Placement of topsoil (approximately 25,000 cu. yd.) over 90% of the side slopes;

(3) Placement and compaction of soil (approximately 78,000 cu. yd.) onto the top of the landfill for the grading layer, and as an interim compacted 2-foot clay cover;

(4) Placement of 17 settlement plates to monitor landfill settlement;

(5) Sampling of ponded water and sediment located on northern most edge of landfill site;

(6) Removal and sampling of one crushed 55 gallon drum, and adjacent soil from the northern edge of the landfill;

(7) Soil sampling of the agricultural field (later to become the borrow pit soil) west of the landfill; and,

(8) The extension of two gas vents on top of the landfill.

From 1992 to February 1993, the Interim Remedial Measures continued with

(1) Placement and compaction of soil (approx. 90,500 cu. yd.) onto the top of the landfill to complete the grading layer;

(2) Excavation of soil (3,463 cu. yd.) from the leachate contaminated storm water drainage channels on agricultural land adjacent to and north of the site, and backfilling of these areas with soil and topsoil (5,063 cu. yd.);

(3) Removal of approximately 50,000 gals. of ponded storm water from the convergence/confluence of the drainage channels;

(4) Construction of a low permeability, 2-foot clay soil layer on the landfill crest;

(5) Construction of a 6-inch vegetation soil layer of topsoil (38,000 cu. yd.);

(6) Removal of ponded storm water and excavation of sediments from the northern most area of the site and backfilling of the area with soil;

(7) Installation of a site security chain linked fence around the landfill site;

(8) Property boundary site survey;

(9) Rip-rap erosion control installation for storm water runoff north of the site;

(10) Seeding, mulching, and erosion control measures for the interim cap/soil cover; and

(11) Relocation of the C&NW (Railroad) Transportation Company communication utility line from overhead to below ground on the north side of the tracks at the northern edge of the landfill site.

These capping actions were undertaken to provide additional cover for the landfill wastes. In

addition, the actions reduced the infiltration of precipitation into the landfill thus reducing leachate generation and groundwater contamination. These interim actions were implemented under the authority of the March 29, 1991 Consent Order.

During April 1993, to maintain the required freeboard or safe level of leachate liquids within the surface impoundment, the MLTF removed approximately 181,000 gallons of liquid from the impoundment in April 1993. An additional 78,000 gallons of liquids were removed from the leachate surface impoundment in July 1993. These interim remedial actions occurred under the authority of both the 1990 and 1991 Consent Orders.

Recent Emergency Response Actions

In mid-May 1999, the interception and emergency removal of landfill gas began in the area adjacent to and west of the landfill, and within the subdivision. It was initially determined by the PRPs in late March 1999 that the landfill gas had migrated over 700 ft. into the western most area of the soil borrow pit. The soil borrow pit bordered the eastern boundary of the new Wycliffe Estates subdivision, which was still under going development. In mid-April 1999 the PRPs confirmed the presence of landfill gas and informed the Illinois EPA. The Illinois EPA responded to the potential emergency situation by sampling homes within the subdivision for landfill gas and VOCs. This emergency response action was implemented under the authority of the March 29, 1991 Consent Order.

The Illinois EPA response determined that there was methane gas in the basements and sumps of some of the houses. A short-term evacuation was recommended for a few of the residences, due to flammability conditions that existed in a few of the basement sumps. The Illinois EPA responded with the assistance of the City of Belvidere and Boone County personnel. During the initial emergency the PRPs representatives observed the sampling process. The PRPs and their representatives, at the request of the Illinois EPA, installed landfill gas extractions wells east of the subdivision, a gas interceptor trench immediately West of the landfill, home gas monitors, sump gas evacuation systems, and additional gas/groundwater sampling probes within the subdivision. The landfill gas extraction system was installed and became operation less than one month of the Illinois EPA determining that there was a gas migration problem. Within days of the gas extractions system becoming operational, gas levels began to decline.

Planned Actions

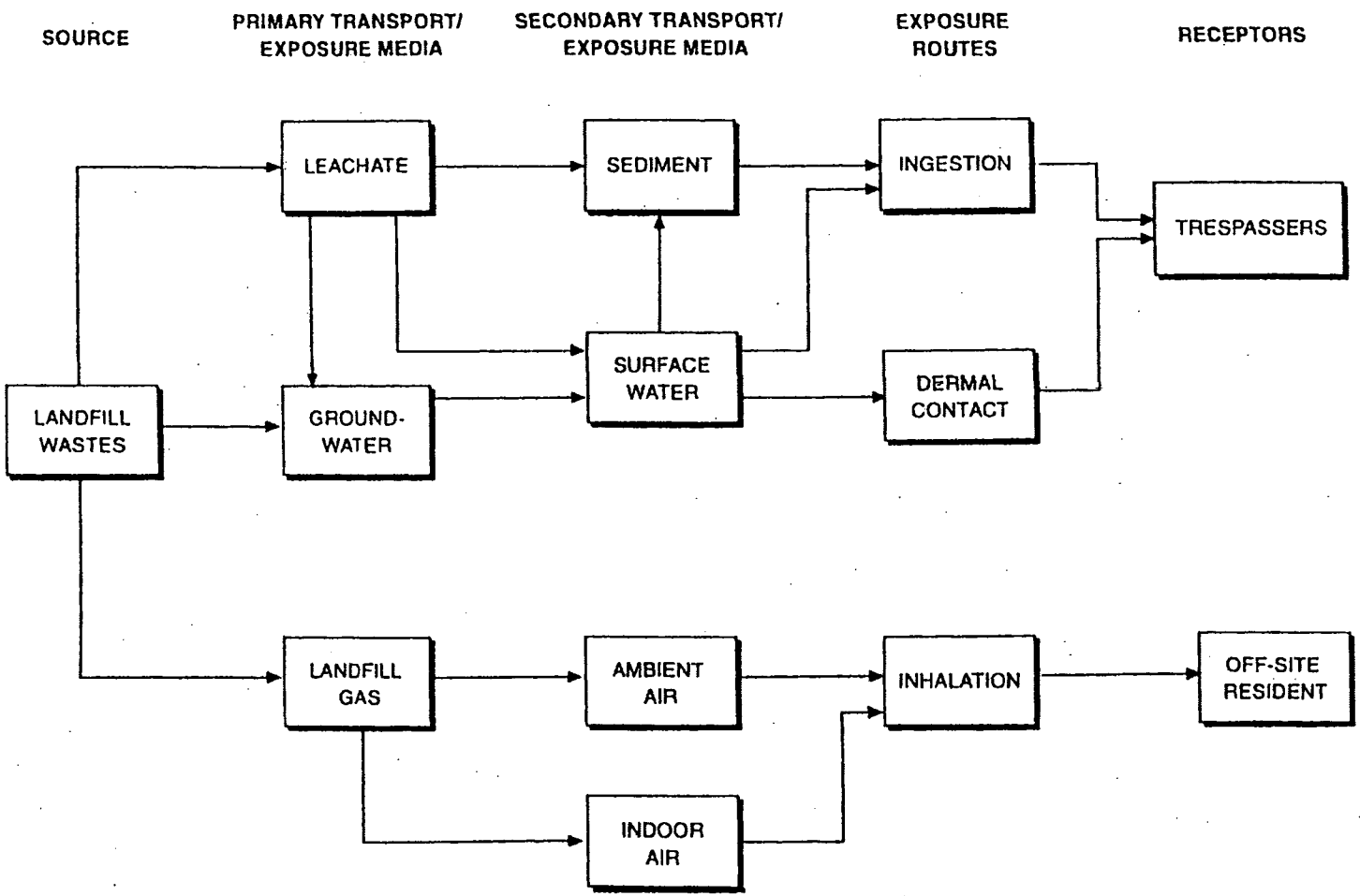
- Construction and operation of a leachate collection, removal and monitoring system.
- Construction and operation of an active and passive landfill gas collection system and monitoring program.
- Leachate surface impoundment closure.

- Surface water diversion system.
- Implementation of access restrictions and institutional controls.
- Natural attenuation of groundwater.
- Long-term groundwater monitoring.
- Construction of a new cap over the entire landfill to minimize the infiltration of precipitation into the landfill.
- Prepare Risk Assessment addendum to address potential risk to Wycliffe subdivision.

The capping of the landfill will effectively reduce groundwater infiltration through the landfill waste, thus reducing the generation of landfill leachate and gas. The landfill gas is presently being actively remediated as mentioned above. Passive gas vents will be placed throughout the landfill crest. Access restrictions and institutional controls will prevent access and exposure to contaminants. The landfill cap and a leachate collection system will result in dramatically reduced contamination to groundwater by contaminants such as VOCs. Contaminants presently in the groundwater and soil are undergoing natural attenuation or intrinsic remediation due to the composition and chemistry of the soil. Cleanup objectives for the Contaminants of Concern in the groundwater will be the Maximum Contaminant Level (MCL) for Class I ground water. These actions will be implemented under the authority of the March 29, 1991 Consent Order.

V. Site Characteristics

The organic and inorganic contaminants identified at the landfill during the RI have several potential pathways by which people may be exposed, if no further remedial action would occur. The most pertinent pathways include direct contact, volatilization and wind dispersal, landfill gas, erosion and runoff, surface water, and groundwater. These pathways are represented graphically below as the site conceptual model.


SOURCE
PRIMARY TRANSPORT/ EXPOSURE MEDIA
SECONDARY TRANSPORT/ EXPOSURE MEDIA
EXPOSURE ROUTES
RECEPTORS
LEACHATE
SEDIMENT
INGESTION
TRESPASSERS
SURFACE WATER
DERMAL CONTACT
LANDFILL WASTES
GROUND-WATER
LANDFILL GAS
AMBIENT AIR
INHALATION
OFF-SITE RESIDENT
INDOOR AIR

- There is a potential for exposure to the contaminants onsite via direct contact with the landfill surface soil, landfill leachate via seeps and sediment, and surface impoundment liquid and sediment. There is also a potential for exposure to contaminants via direct contact with liquid and soil associated with the two intermittent drainage channels in the field located north of the landfill and the intermittent stream sediment and water. As noted in the baseline risk assessment, direct or dermal contact with the soil and water is not expected to be significant and was not evaluated at the site.

- There is a potential for exposure to the contaminants in landfill gas, soils, and sediments via the volatilization and wind pathway to individuals onsite and downwind.

- There is a potential for exposure to the contaminants via the landfill gas pathway to onsite workers who conduct subsurface activities and to offsite areas.

- Erosion and runoff comprise an intermediate transport pathway for contaminants to migrate from the landfill to the two intermittent drainage channels in the field located to the north of the landfill, to the former landfill borrow area south of the landfill, to the intermittent stream east of the landfill; and finally, to the Kishwaukee River.

- There is a potential for exposure to the contaminants via the surface water pathway. Since the Kishwaukee River is not used as a potable water source, the primary receptors for the surface water pathway are aquatic and terrestrial wildlife that come into contact with the waterway. The RI determined that the surface water pathway does not currently serve as an exposure pathway for landfill derived contaminants being transported to surface water receptors.

- The RI had identified two primary groundwater pathways. These groundwater pathways are referred to as the West Glacial Drift Pathway and the North Interface Pathway. Both of these groundwater pathways have no direct receptors since there are no current users of the impacted groundwater downgradient from the landfill and there is no realistic future potential for groundwater use due to institutional controls. Institutional controls such as zoning and health code regulations, do not allow for building houses in the flood plain nor the placement of drinking water wells. Additional institutional controls, such as dede restrictions on the use of this property, will be implemented, if needed to supplement the zoning and health code regulations. The groundwater pathways do comprise an intermediate transport pathway for contaminants to migrate from the landfill to surface water pathways and to future residential indoor air pathways. An examination of the impact of Volatile Organic Compounds (VOCs) migrating along the Western Glacial Drift pathway and then offgassing to future residential basement air was evaluated as part of the baseline risk assessment using conservative contaminant migration and attenuation assumptions. The baseline risk assessment estimated that there might be low part per

billion concentrations of VOCs offgassing from the Western Glacial Drift groundwater that has the potential of posing a risk when coupled with gas migration. The potential exposure to landfill gases and VOCs is being addressed by the installation and start up of the landfill gas interceptor trench and gas extraction using withdraw wells. The baseline risk assessment determined that there may be a potential significant risk of future chronic exposures to residents with homes in or possibly near the soil borrow pit, if no further remedial actions occur. Additional sampling occurred February 2000 to provide updated information for an addendum to the original baseline risk assessment.

Site Size

The MIG/DeWane Landfill occupies an area of approximately 47 acres including an adjacent leachate surface impoundment near the eastern slope of the landfill. The Site and surrounding area lies within the Rock River Hill Country physiographic province of Illinois and the Kishwaukee River Basin. The Rock River Hill Country is physiographic province as characterized by gently rolling topography, which is a result of Pleistocene glaciation that eroded, reshaped, and modified the landscape. The Kishwaukee River is located approximately 1,000 feet north of the landfill. The westward flowing Kishwaukee River and its tributaries drain most of Boone County. The Kishwaukee River is a major tributary to the Rock River, which is, located about 15 miles west of the city of Belvidere.

The regional topography is controlled mainly by bedrock, which is generally within 50 feet of the ground surface. Regionally, ground surface elevations in Boone County range from about 1,000 feet above Mean Sea Level (MSL) in northern Boone County to just below 700 feet above MSL along the Kishwaukee River in the south. The maximum ground surface elevation in the study area is approximately 850 feet MSL. The minimum ground surface elevation in the borrow pit west of the landfill is approximately 790 feet above MSL.

The landfill rises to a height of approximately 50 to 55 feet above the surrounding terrain. The landfill is bounded on the north by the Chicago and Northwestern railroad tracks and the Commonwealth Edison right-of-way. Agricultural and commercial properties are located to the east and south of the landfill. A soil borrow pit, used to provide soil for the interim landfill cap, abuts the west side of the landfill. Approximately 750 feet west of the landfill is a residential housing development.

Surface and Subsurface Features

As stated above, the 47-acre landfill rises to a height of approximately 50 to 55 feet above the adjacent land surface and even higher above the adjacent soil borrow pit to the west. The estimated volume of waste within the landfill is approximately 3,715,200 cubic yards.

There are no known "hot spots" areas of highly toxic and/or mobile source material that represent principal threat waste). Historical records and physical evidence do not document any

discrete subsurface disposal areas. The existing leachate collection system was designed to allow gravity drainage of leachate from the landfill to a single leachate lagoon (surface impoundment). The majority of the leachate collection drain system was installed in the clay lined former gravel pit. The base of fill / top of sandy till in areas located west of the former gravel pit were designed to slope at a 1 % grade from west to east towards the leachate collection system.

Remedial Investigation Sampling Strategy

The primary objective of the RI is to evaluate the presence, nature, and extent of landfill contaminants in various media in the Site study area. RI field activities were conducted during the following investigation events: Round 1 (May 1993 to November 1993), Round 2 (October 1994 to January 1995, Round 3 (July 1995 to September 1995), Round 4 (November 1995), and the Supplemental Waste Delineation Survey (September 1996 to October 1996). RI field efforts included the following tasks:

- Installation of landfill leachate wells and gas probes.
- Geophysical and soil boring delineation survey and a supplemental waste delineation survey to define the limits of the refuse disposal.
- Surface impoundment geotechnical survey to evaluate its structural integrity.
- Ambient air survey to evaluate the landfill's emission of volatile organic compounds (VOCs) and methane.
- Collection of leachate well liquid, leachate seep liquid and sediment, surface impoundment liquid and sediment, and gas probe vapor samples.
- Advancement of 53 soil borings and installation of 27 monitoring wells.
- Characterization of study area meteorology, surface water, soil, geology, and hydrogeology.
- Ecological investigation that included a wetland delineation survey, ecological field survey, demographic survey, and a land use survey.
- Collection of surface soil, vadose zone soil, and phreatic zone soil samples.
- Collection of groundwater samples from four residential well and 27 monitoring wells.
- Collection of surface water and sediment samples from the intermittent stream and the Kishwaukee River.

Nature and Extent of Contamination

During the RI, samples were taken from the potential source areas and the potential migration pathways at the Site. The sources include the landfill, landfill gas, leachate surface impoundment, leachate, and the media include groundwater, surface water, soil, leachate, gas/air and sediments. Additionally, groundwater from four, off-site private supply wells were sampled to assess potential impacts from the Site related wastes.

The inorganic and organic contaminants identified during the RI have several potential fate and transport pathways. The propensity for migration of inorganics from the source areas is more limited than for the organics. Migration of inorganics is limited because the contaminants is likely to undergo reactions such as bonding with clay through adsorption or ion exchange; or bonding with organic materials by complex reactions. Semi-Volatile Organic Contaminants (SVOCs) migrate more readily than inorganics; however, their relatively low solubilities inhibit their transport rate. VOC contaminants are typically the most mobile and have the potential to migrate as a liquid and a gas. Various migration pathways are possible; however, some pathways are more probable based on the physical characteristics and analytical data collected during the RI. The most pertinent pathways are direct contact, volatilization and wind, landfill gas, erosion and runoff, surface water, and groundwater.

Contaminant Source

The major source of contamination is the 47-acre landfill itself and, to a lesser extent, the leachate surface impoundment. An estimated 3,700,000 cubic yards of waste is in currently occupying the landfill. The main COCs for the site include organic compounds vinyl chloride, methylene chloride, 1,1-dichloroethene, 1,2-dicholopropane, tricholorethene, benzene and tetrachloroethene. In addition, the following inorganic compounds are antimony, arsenic, chromium, iron, lead, manganese, mercury, nickel and boron. These compounds were detected in groundwater monitoring wells, during the RI, at levels that meet or exceed regulatory groundwater standards.

Groundwater flows predominately to the north and to a lesser extent northwest. Two principal horizontal groundwater flow paths exist within the Glacial Drift aquifer. One path is north of the Kishwaukee River and one path is south of river and west of the landfill. South of the Kishwaukee River in the immediate vicinity of the landfill, groundwater flow in the Glacial Drift aquifer occurs predominantly west of the landfill in the sand and gravel lens encountered at boring locations MW03, MW13, and MW14 (Till/Sand Lens Zone). Groundwater flows through this sand and gravel lens in a northwesterly direction. Based on the RI data, the Glacial Drift aquifer located along the north flank of the landfill does not appear to serve as a principal groundwater flow pathway.

Contaminated Media

Media of concern include leachate, leachate sediments, soil, landfill gas, surface water, and groundwater. Landfill leachate containing various chemicals is generated from the infiltration of precipitation into the landfill. It is the landfill leachate that appears to be responsible for the contamination of the other media. The landfill gas contains many of the COCs designated as VOCs. All of the COCs identified by the baseline risk assessment, both those that exceed and those that do not exceed the MCL include:

VOCs: Acetone, Benzene, Chlorobenzene, Chloroethane; 1,1-Dichloroethane; 1,1-Dichloroethene; 1,2-Dichloropropane, Ethybenzene, Methane, Methylene Chloride, Tetrachloroethene, Toluene; 1,1,2-Trichlorethane, Tricholoethene, and Vinyl Chloride.

SVOCs: Benzo(A)Pyrene and 4-Methylphenol.

Pesticides/PCBs: Dieldrin and Endrin Aldehyde.

Inorganics: Antimony, Arsenic, Beryllium, Iron, Lead, and Manganese.

Landfill Gas

Six gas probes were installed atop the landfill during the RI (since then another 12 probes have been installed within or near the Wycliffe subdivision). The results of two RI rounds of gas probe vapor sampling indicated the presence of numerous VOCs at concentrations greater than 1,000 part per billion volume (ppbv). These VOCs include: chloroethane (6,500 ppbv), acetone (1,600 ppbv), 1,1-Dichloroethane (2,800 ppbv), 2-Butanone (1,200 ppbv), Toluene (20,000 ppbv), ethylebenzene (5,500 ppbv), xylenes (13,000 ppbv). Also, the following contaminants were detected at concentrations between 50 and 1,000 ppbv: methylene chloride (640 ppbv), benzene (330 ppbv), tetrachloroethene (89 ppbv), vinyl chloride (700 ppbv), 1,1,1-trichloroethane (841 ppbv), trichloroethene (360 ppbv), and chlorobenzene (640 ppbv). Methane was detected in gas probe vapor at concentrations ranging from 10 to 50%.

Leachate

Leachate liquid sample were collected during two RI sampling rounds from two leachate wells atop the landfill, 25 major leachate seep locations around the perimeter of the landfill, and the surface impoundment. Leachate sediment samples were collected during two RI sampling rounds from 27 major leachate seep locations around the perimeter of the landfill and from the bottom of the surface impoundment. The analytical results from leachate liquid and sediment samples indicate the presence of eight VOCs and five semi-volatile organic compounds (SVOCs) at concentrations above 1 part per million (1 ppm).

Analytical results for leachate liquid samples indicate the presence of 11 inorganic analytes

detected in concentrations above background surface water and groundwater quality levels. Analytical results from leachate sediment samples indicate the presence of inorganic analytes in leachate seep sediment and surface impoundment sediment samples; however, the concentrations detected are less than the U.S. EPA's Generic Soil Screening Levels (SSLs).

Soil

Surface and shallow subsurface soil sample were collected once during the IRM activities from 10 locations along the two intermittent drainage channels located in the field directly north of the landfill. Surface soil, vadose zone soil, and phreatic zone soil samples were collected during one RI sampling round. Surface soil samples were collected from 10 locations inside the perimeter of the landfill fence and from nine locations outside the perimeter fence. At total of 14 vadose zone soil samples were collected from eight soil borings located south of the Kishwaukee River. Phreatic zone soil samples were collected from nine soil borings located south of the Kishwaukee River and from one soil boring north of the river.

The analytical results for soil samples collected inside the perimeter of the landfill fence indicate the presence of VOCs, SVOCs, pesticides, polychlorinated biphenyls (PBCs), and inorganic analytes. All of the VOCs detected in soil were also detected in leachate seep sediment samples; however, concentrations in the soil were much lower than those detected in the sediment. Several VOCs were detected in the sediment, but not detected in the soil. Many of the same SVOCs were detected in both surface soil and sediment. The concentrations were similar in both surface soil and sediment except for 4-methylphenol, which was detected at higher concentrations in sediment. Trace to low concentrations of organic and inorganic constituents were detected in soil samples collected outside the fenced landfill perimeter. The presence of low level pesticide concentrations detected outside of the landfill perimeter fence is not attributed to the landfill, but to the surrounding agricultural land use.

Analytical results from the IRM and RI soil sampling activities indicate that the soil outside the fenced landfill source area has not been impacted by landfill source area constituents.

Residential Well Groundwater

Residential well groundwater samples were collected twice during the RI from four locations. Residential well groundwater samples had no detectable concentrations of VOCs, SVOCs, pesticides, and PCBs. Except for nitrate+nitrite, the detected concentrations of inorganic analytes in residential well samples are typical of regional groundwater and were not above any regulatory groundwater standards. Tow of the residential well samples contained concentrations of nitrate+nitrite that were above its regulatory groundwater standard. The presence of nitrate+nitrite can be attributed to the application of fertilizers and the long history of farming activities that have occurred at these locations.

Monitoring Well Groundwater

Monitoring well groundwater samples were collected during four RI sampling rounds from 27 monitoring wells. VOC, SVOC, and levels of inorganic analyte and wet chemistry parameter constituents above background quality have been identified in the groundwater on the north and west sides of the landfill. Concentrations of six VOCs, six inorganic analytes, and two wet chemistry parameters that may be attributable to the landfill are above Class I groundwater quality criteria.

Surface Water and Sediments

Surface water and sediment samples were collected from the intermittent stream system and the Kishwaukee River on during three RI field sampling events to characterize the chemical composition of surface water and associated sediment in the study area. Surface water and sediment sampling took place during Rounds 1, 2, and 4 field activities. The surface water and sediment sample were collected from four locations along the intermittent stream. Two VOCs were detected in one intermittent stream surface water sample. Carbon disulfide and toluene were detected at respective concentrations of approximately 3 J ug/L and 2 J ug/L. Three SVOCs were detected in intermittent stream water samples. Di-n-butylphthalate, 4-methylphenol, and bis(2-ethlyhexyl)phthalate were detected a concentration of 2 J ug/L, 3 J ug/L, and 4 J ug/L, respectively. Three VOCs and seventeen SVOCs were detected in intermittent stream sediment samples. The three VOCs acetone, 2-butanone, and toluene were detected at the respective concentrations of 9 and 100 J ug/kg, 33 ug/kg, and 2 J ug/kg. Seventeen SVOCs were detected in intermittent stream sediment samples. The seventeen detected SVOCs consisted of 4-methylphenol, two phthalates, and fourteen PAHs. The detection levels for the seventeen chemicals varied at four sample locations. Also detected were nine pesticide compounds at relatively low concentrations. The intermittent stream receives runoff from agricultural fields. The pesticides are indicative of past and current agricultural land use in the area. Two PCB compounds were detected at low concentrations in intermittent stream sediment samples.

Surface water and sediment samples were collected from fifteen locations along the Kishwaukee River. A few VOCs were detected in Kishwaukee River sediment samples. Three SVOCs were detected in Kishwaukee River sediment samples. No pesticides were detected in Kishwaukee River sediment samples. Three VOCs were detected in Kishwaukee River surface water samples. Two SVOCs were detected in Kishwaukee River surface water samples. No pesticides or PCBs were detected in the Kishwaukee River surface water samples.

VI. Current and Potential Future Site and Resource Uses

Land Uses:

The current on-site land use, is now and has been for the past 30 years, that of a landfill. The present landfill, however, has not been in operation since 1988. Access to the landfill has already been restricted through construction of a security fence around the entire perimeter of the Landfill with locking gates. Institutional controls at the local level will be needed to prevent human exposure to risks associated with the buried refuse at the Site and leachate constituents present in groundwater.

Offsite groundwater is also impacted by migration of contaminants from the site. Institutional controls are already in place to restrict the use of offsite groundwater by current residential homes to the west of the Landfill. On February 7, 1994, the City of Belvidere (City) annexed the residential development property west of the IRM borrow pit. The IRM borrow pit is located west of the Landfill, and was identified as a potential downgradient receptor point for both impacted groundwater and landfill gas migration to the west. As part of the annexation agreement (Agreement Numbers 5 and 6), the City agreed to provide sanitary and water service to the annexed property. Consequently, water supply wells have not been, and will not be, installed within the residential area to the west, thus removing offsite groundwater as a current human exposure pathway. The landfill property will require deed restrictions. Although groundwater use in the agricultural field north of the landfill is limited by flood plain zoning restrictions and Boone County Health Department, the need for deed restrictions will be considered. Baseline sampling during the Remedial Design/ Remedial Action activities will be used to evaluate the need for more specific institutional controls.

The property to the north of the Site is identified on the Boone County Zoning Map as a floodplain and has a special use land use designation. Given the identification of this property as a floodplain on the county's zoning map, as well as its lack of access to existing roads, it is not feasible that the property north of the Site can be developed for residential purposes. This property has been used for agricultural purposes in the past.

Adjacent and surrounding land use off-site include the adjacent soil borrow pit, two residential developments, a few small businesses, and agricultural fields. Immediately to the west and adjacent to the landfill is a soil borrow pit. Approximately 700 feet to the west is a residential development. To the north, east, and south of the Site are agricultural fields. There are twelve water wells within one-half mile of the Site. There are no wells being impacted by the landfill, downgradient of Site. Broken down into percentages, the land use in this one-half mile radius of the Site is:

- 47% Agricultural
- 19% Developed (commercial and residential)
- 10% Wooded

- 5% Landfill
- 5% Wetlands
- 4% Planned future development (presently agricultural)
- 4% Commercial waste water discharge field
- 2% Waste fields and roadsides
- 2% Borrow field
- 2% Kishwaukee River and tributaries

Groundwater and Surface Water Uses:

Current ground/surface water use on the Site and the vicinity is limited to the use of the Kishwaukee River for recreation and fishing. The groundwater in the vicinity of the Site is classified as a Class I aquifer. Potential and future use of groundwater is restricted at and in the area of the Site due to local zoning and health department restrictions, and to the extent further restrictions may be needed they will be addressed after completion of the RD/RA baseline sampling.

Institutional controls are already in place to restrict the use of offsite groundwater by current residential homes to the west of the Landfill. On February 7, 1994, the City of Belvidere (City) annexed property west of the IRM borrow pit for residential development. The IRM borrow pit is located west of the Landfill, and was identified as a potential downgradient receptor point for both impacted groundwater and landfill gas migration to the west. As part of the annexation agreement, the City agreed to provide sanitary and water service to the annexed property. Consequently, water supply wells have not been, and will not be, installed within the residential area to the west, thus removing offsite groundwater (drinking water) as a current human exposure pathway. Per the Boone County Health Department, a permit to install a water-well will not be issued if municipal water is provided by the City. A deed restriction has been placed on the IRM borrow pit property, which restricts the use of this property. This restriction prohibits future residential development.

The groundwater at the Site and in the areas immediately adjacent to the Site is not used as a drinking water source. Private, drinking wells do exist north of the Kishwaukee River, but groundwater flow north of the river is south towards the river.

Groundwater batch flushing model analysis and the groundwater flow path analysis were integrated to develop time frame estimates for monitored natural attenuation to attain Illinois

Class I groundwater quality criteria for the various scenarios that were evaluated. It should be noted that alternative groundwater pump and treat or containment approaches, the other remedial actions that can be considered for offsite groundwater, would not be any more effective as monitored natural attenuation for the Site. The time frame required for monitored natural attenuation to reach Illinois Class I groundwater quality criteria for the West Glacial Pathway is estimated to range from 13 to 26 years. This groundwater pathway is west-northwest under the soil borrow pit and part of the Wycliffe subdivision and then northwest towards the Kishwaukee River. Residents within the subdivision are connecting to Belvidere city water. The time frame is the same for the contingent leachate removal scenario.

The time frame required for natural attenuation to reach Illinois Class I groundwater quality criteria of the North Interface Pathway under the planned leachate removal scenario is estimated to range from 81 to 108 years. Whereas the time frame under the contingent leachate removal scenario with active groundwater withdraw is estimated to range from 54 to 81 years. The North Interface Pathway for groundwater is directly north from the landfill towards the river.

The groundwater for this pathway runs under an agricultural field that is within the Kishwaukee flood plain. The property to the north of the Site is identified on the Boone County Zoning Map as a floodplain and has a special use land use designation. In accordance with Section 17.12 of the Boone County Zoning Ordinance, no development can be allowed below the base flood elevation for the "Special Flood Hazard Area" (SFHA) that would create a damaging or potentially damaging increase in flood heights or velocity or threat to public health and safety. Section 17.3 of the Boone County Zoning Ordinance defines the base flood elevation for the SFHA of the Kishwaukee River as the 100-year floodplain. Given the identification of this property as a floodplain on the county's zoning map, as well as its lack of access to existing roads, it is not feasible that the property north of the Site can be developed for residential purposes.

A total of eight municipal wells provide potable water to the City of Belvidere. The closest municipal well to the landfill is municipal well No. 7. This well is located approximately 4,000 feet southwest of the landfill. The residential subdivisions on the west and south side of the study area are connected to the City of Belvidere municipal water supply system. The closest residential well to the landfill is located about 1,500 feet to the north of the landfill. The well is located north of the Kishwaukee River where groundwater flow is southward, towards the river. Currently, there are no municipal, domestic, or commercial wells located downgradient of the landfill (between the landfill and the Kishwaukee River). Future land use analysis indicates that there is no potential for a municipal, domestic, or commercial well to be installed in the area.

VII. Summary of Site Risks

Baseline Risk Assessment (Human Health and Ecological Assessments)

The response action selected in this Record of Decision is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. Some remedial action is therefore warranted.

The baseline risk assessment contains both baseline human health and ecological risk assessments. The risk assessments have been prepared to evaluate the potential for adverse effects and significant risks to human and ecological receptors at and in the vicinity of the MIG/DeWane Landfill in Belvidere, Illinois. The baseline risk assessment occurred after the interim response actions were completed, and during and after the RI was completed. Information from the RI was used to complete the RI Report and the baseline risk assessment. The possible risks associated with the site are those that are present or may occur even though an interim cap is in place, and no further action occurs to remediate the site. The baseline risk assessment for MIG/DeWane is a document titled, *Final Report Human Health and Ecological Risk Assessment for the MIG/DeWane Landfill* (March 1997). Both assessments use site-related chemical concentrations, exposure potential, and toxicity information to characterize potential risks to human health and the environment.

Summary of Human Health Assessment

The baseline risk assessment estimates what risks the site poses if no action were taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. This section of the ROD summarizes the results of the baseline risk assessment for this site.

The human health assessment portion of the baseline risk assessment evaluated both current and future risks to trespassers and offsite residents associated with exposure to soil sediment, surface water, and landfill gas via indoor and outside air. The risk assessment characterized contaminants and the potential exposures in the absence of remediation in order to determine which risks need to be reduced or eliminated.

The baseline risk assessment concluded that if no remediation occurs at the site a potential significant risk to human health may exist at the site associated with the following exposure pathways: (1) acute exposures to the surface impoundment; and (2) future chronic exposure to residents with homes near the borrow pit to the west of the landfill. Acute exposures are generally those that occur from high levels of contaminant exposure over a short period of time. Chronic exposure are generally those that occur from low levels of contaminant exposure over a long period of time.

The baseline risk assessment included both qualitative and quantitative evaluations of risk. Three human health exposure scenarios were evaluated quantitatively: (1) child trespasser; (2) a current residential scenario; and (3) a future residential scenario. Chronic exposures were evaluated for all three receptors, while an acute exposure scenario was investigated for the child trespasser accidentally falling into the surface impoundment.

The U.S. EPA has established a target risk range of 1×10^{-4} (one in ten thousand) to 1×10^{-6} (one in a million) excess-lifetime Cancer Risk. For noncarcinogens, a Hazard Index is calculated. Remedial action is considered warranted for environmental media having a lifetime cancer risk greater than 10^{-4} or a hazardous index greater than 1.

One critical exposure pathway for the trespasser is an acute ingestion exposure of water and sediment during an accidental fall into the leachate water surface impoundment. Iron in the impoundment sediment is the chemical that drives the risk for the pathway for the trespasser. The hazardous index for the sediment is 1.0. Iron also drives the risk above the threshold level in the incidental ingestion pathway of leachate surface impoundment water. The hazardous index for the leachate surface impoundment sediment is 5.8.

Indoor air exposures by inhalation of landfill gas and groundwater volatiles pose a potential significant risk to future residents if they were to build in or near the soil borrow pit area to the west of the landfill site, and no further remediation occurs. The cancer risk for future residents is 1.1×10^{-3}. Chlorobenzene and toluene are the chemicals that drive the noncarcinogenic risk in this scenario. Benzene and vinyl chloride drive the carcinogenic risk. This scenario is considered reasonable given the proximity of some residences to the western boundary of the soil borrow pit area. Additional sampling of for landfill gas, and for VOCs has recently occurred in February 2000. The new sampling information will be used to update the baseline risk assessment.

In addition to the above mentioned risks, landfill methane concentrations were previously determined by the baseline risk assessment to being a risk to public safety, due to flammability, should development occur in soil borrow pit which is located adjacent to and west of the landfill. Recent new information from April 1999, also determined that methane gas presented a possible flammability risk for those individuals living in the eastern area of the subdivision. The methane and landfill gas risks have been greatly reduced due to the installation and startup in May 1999 of a landfill gas extraction system and interceptor trench within the soil borrow pit area.

Groundwater, although contaminated, was eliminated as a complete critical contaminant pathway due to institutional controls (i.e., zoning and health regulations) there should not be any contact with or consumption of the contaminated groundwater. Local residents use water supplied by the city. Local regulations and zoning prohibited the installation of private drinking wells. These institutional controls are necessary to prevent human contact with the contaminated groundwater, thus eliminating the current human groundwater risk. The Illinois EPA, and the PRPs determined that zoning laws and other regulations would not allow for the installation of private drinking wells on-site or areas off-site that were contaminated. The installation of a new landfill cap will further protect the groundwater from infiltration and precipitation-generated leachate. There is not a current completed pathway. However, the groundwater path is considered a potential drinking water source and there is the potential for future migration of contaminants through groundwater to surface water. The groundwater will therefore need to be remediated.

Section 1: Chemicals of Concern (COCs) for the Human Health Assessment

The main COCs for the site include organic compounds vinyl chloride, methylene chloride, 1,1-dichloroethene, 1,2-dichloropropane, tricholorethene, benzene and tetrachloroethene. In addition, the following inorganic compounds are included: antimony, arsenic, chromium, iron, lead, manganese, mercury, nickel and boron. These compounds were detected in groundwater monitoring wells, during the RI, at levels that meet or exceed regulatory groundwater standards. The tables below show the maximum concentrations detected of VOCs and SVOCs in the leachate and groundwater monitoring wells.

TABLE 4-1

MAXIMUM CONCENTRATION OF VOCS DETECTED

IN SOURCE AREA MEDIA

MIG/DeWane Landfill

Belvidere, Illinois

		SOURCE AREA MEDIA					
	VOCS WITH MAXIMUM DETECTED CONCENTRATIONS X > 1,000 ug/L, ug/kg, or ppbv	Leachate Well Liquid ug/L	Leachate Seep Sediment ug/kg	Leachate Seep Liquid ug/L	Surface Impoundment Liquid Ug/L	Surface Probe Sediment ug/kg	Gas Vapor Ppbv
004.	Chloroethane	U	U	64	U	U	6,500
005.	Methylenechloride	U	12,000	3,200	53 J	U	640
006.	Acetone	17,000	13,000	17,000 J	6,600	1,400 J	1,600
009.	1,1-Dichloroethane	U	720 J	190 J	U	U	2,800
013.	2-Butanone	46,000	22,000	39,000 J	3,700	U	1,200
022.	Benzene*	11 J	1,500	17 J	U	U	330
027.	Tetrachloroethene*	U	2,100 J	420 J	U	U	89
029.	Toluene	1,000	5,200 J	1,200	210 J	70 J	20,000 E
031.	Ethylbenzene	190	4,500	110	U	980 J	5,500
033.	Xylenes (Total)	660	36,000	380	120 J	5,000	13,000

		SOURCE AREA MEDIA					
	VOCS WITH MAXIMUM DETECTED CONCENTRATIONS 10 < X< 1,000 ug/L, ug/kg, or ppbv	Leachate Well Liquid ug/L	Leachate Seep Sediment ug/kg	Leachate Seep Liquid ug/L	Surface Impoundment Liquid ug/L	Surface Probe Sediment ug/kg	Gas Vapor Ppbv
003.	Vinylchloride*	6 J	U	U	U	U	700
007.	Carbondisulfide	U	U	U	U	19 J	U
014.	1,1,1-Trichloroethane	U	U	U	U	U	841
019.	Trichloroethene*	U	350 J	340 J	U	U	360
025.	4-Methyl-2-Pentanone	430	250 B	160 J	340 J	U	U
026.	2-Hexanone	39 J	870	U	U	U	U
030.	Chlorobenzene	U	U	11 J	U	U	640

—bNOTES: ug/L = microgram per liter or part per billion (ppb).

ug/kg = microgram per kilogram or part per billion (ppb).

ppbv = part per billion volume (ppbv).

* = This VOC was detected in monitoring well groundwater samples at concentrations above above regulatory groundwater standards.

J = Reported result is quantitatively estimated.

U = Not detected.

B = Constituent also present in laboratory blank.

E = Constituent concentration exceeds the value listed.

TABLE 4-2

MAXIMUM CONCENTRATION OF SVOCS DETECTED

IN SOURCE AREA MEDIA

MIG/DeWane Landfill

Belvidere, Illinois

	SOURCE AREA MEDIA					
	SVOCS WITH MAXIMUM DETECTED CONCENTRATIONS X > 1,000 ug/L, or ug/kg	**Leachate Well Liquid ug/L**	**Leachate Seep Sediment ug/kg**	**Leachate Seep Liquid ug/L**	**Surface Impoundment Liquid Ug/L**	**Surface Impoundment Sediment ug/kg**
034.	Phenol	3,400J	12,000J	7,100J	2,400J	U
042.	4-Methylphenol	20,000J	76,000	12,000J	4,200J	2,100J
052.	Napthalene	48J	1,200 J	20J	U	660J
080.	Phenanthrene	U	2,700 J	4J	U	200J
090.	Bis(2-ethylhexyl)phthalate	12J	320J	U	U	3,900
	SOURCE AREA MEDIA					
	SVOCS WITH MAXIMUM DETECTED CONCENTRATIONS 10 < X< 1,000 ug/L or ug/kg	**Leachate Well Liquid ug/L**	**Leachate Seep Sediment ug/kg**	**Leachate Seep Liquid ug/L**	**Surface Impoundment Liquid ug/L**	**Surface Impoundment Sediment ug/kg**
038.	1,4-Dichlorobenzene	32J	U	7J	U	U
040.	2-Methylphenol	11J	U	U	U	76J
046.	Isophorone	11J	U	U	U	U
048.	2,4-Dimethylphenol	55J	U	14J	U	U
055.	4-Chloro-3-methylphenol	U	U	42J	U	U
056.	2-Methylnaphthalene	300	U	22J	U	U
066.	Acenaphthene	U	58J	U	U	U
071.	Diethylphthalate	35J	530J	22	160J	96J
073.	Fluorene	U	70J	U	U	180J
076.	N-Nitrosodiphenylamine	U	U	U	U	120J
079.	Pentachlorophenol	U	190J	U	U	U
082.	Carbazole	79J	53J	U	U	160J
083.	Di-n-butylphthalate	U	U	U	U	88J
084.	Fluoranthene	10J	120J	U	U	470J
085.	Pyrene	11J	91J	U	U	370J
086.	Butylbenzylphthalate	U	U	U	U	180J
088.	Benzo(a)anthracene	U	U	U	U	190J
089.	Chrysene	U	U	U	U	220J
091.	Di-n-octylphthalate	U	U	U	U	460J
092.	Benzo(b)fluoranthene	U	44J	U	U	170J
093.	Benzo(k)fluoranthene	U	U	U	U	190J
094.	Benzo(a)pyrene	U	U	U	U	180J
095.	Indeno(1,2,3-c,d)pyrene	U	U	U	U	110J
097.	Benzo(g,h,i)perylene	U	U	U	U	82J

NOTES: ug/L = microgram per liter or part per billion (ppb).

ug/kg = microgram per kilogram or part per billion (ppb).

J = Reported result is quantitatively estimated.

U = Not detected.

The RI investigation involved sampling soil, leachate, landfill gas, surface water and surface sediments. RI sampling determined that some contaminants in groundwater and leachate exceeded Maximum Contaminant Levels (MCLs). VOCs, SVOCs and inorganic chemical compounds were detected. Because of the presence of these chemicals, an assessment was conducted to estimate the possible health and environmental risks that could result if the contamination in the soil, leachate, sediments, landfill gas, surface water and groundwater were not addressed. The assessment, commonly referred to as the baseline risk assessment, evaluated current and future potential human health and environmental risks from exposure to chemicals associated with the site at the time of the remedial investigation. Other contaminants were identified, but at levels below regulatory standards.

VOCs: Acetone, Benzene, Chlorobenzene, Chloroethane; 1,1-Dichloroethane; 1,1- Dichloroethene; 1,2-Dichloropropane, Ethybenzene, Methane, Methylene Chloride, Tetrachloroethene, Toluene; 1,1,2-Trichlorethane, Tricholoethene, and Vinyl Chloride.

SVOCs: Benzo(A)Pyrene and 4-Methylphenol.

Pesticides/PCBs: Dieldrin and Endrin Aldehyde.

Inorganics: Antimony, Arsenic, Beryllium, Iron, Lead, and Manganese.

Contaminated Media

Media of concern includes leachate, leachate sediments, soil, landfill gas, surface water, and groundwater. Landfill leachate containing various chemicals is generated from the infiltration of precipitation into the landfill. It is the landfill leachate that appears to be responsible for the contamination of the other media. The landfill gas contains many of the COCs designated as VOCs.

Data Usability:

Data usability is the process of determining whether or not the quality of the data generated during the sampling program meets the intended use, in this case for the risk assessment purposes. Important data usability issues evaluated in a risk assessment include: (1) data sources; (2) sampling procedures; (3) analytical methods and detection limits; (4) data quality

indicators; and (5) data review and validation.

Uncertainty Analysis:

Certain assumptions underlying any human health risk assessment introduce uncertainty into the results and conclusions. To compensate for uncertainty surrounding input varibles, conservative assumptions are often made which tend to overestimate rather than underestimate risk. In general, assumptions made throughout the risk assessment for this site are conservative in that they do tend to overestimate exposure and resultant health risks rather than underestimate them.

Three sources of uncertainty were identified in pursuit of the Human Health Risk Assessment:

- Scenario uncertainty-- This category includes errors resulting from missing or incomplete information needed to fully define exposure and dose. This may include errors in site information, professional judgement, assumptions regarding exposed populations, and steady-state conditions.

- Parameter uncertainty—Sources of parameter uncertainty include measurement and sampling errors, inherent variability in environmental and exposure-related parameters, and the use of generic surrogate data when site-specific data are not available.

- Model uncertainty—Model uncertainty is often an outgrowth of parameter uncertainty. One source of modeling uncertainty is relationship errors, such as errors in correlations between chemical properties. Errors due to the use of mathematical or conceptual models as simplified representations of reality are also sources of modeling uncertainty.

The uncertainties are presented in the following table.

ASSUMPTION	POTENTIAL MAGNITUDE FOR OVER-ESTIMATION OF RISK	POTENTIAL MAGNITUDE FOR UNDER-ESTIMATION OF RISK	POTENTIAL MAGNITUDE FOR OVER OR UNDER ESTIMATION OF RISK
I. Chemical Data Base			
Representativeness of characterization data base			Low
Treatment of nondetect values			Medium
Exclusion from risk assessment of compounds detected at less than 5% frequency of detection		Medium	
Exclusion from risk assessment of compounds detected at less than naturally occurring background concentrations		Low	
Exclusion from risk assessment of compounds detected that are essential nutrients		Low	
Use of unfiltered, not filtered intermittent stream sampling results	Low		
II. Toxicity Assessment			
Exclusion from risk assessment of compounds with no toxicity information available		Low	
Use of provisional chronic reference dose for iron			Medium
Substituting chronic toxicity values for acute values when no acute values exist	Medium		
Use of upper-bound cancer slope factors to evaluate risks	Medium		
Use of RfDs which incorporate uncertainty factors evaluate risks	Medium		

ASSUMPTION	POTENTIAL MAGNITUDE FOR OVER-ESTIMATION OF RISK	POTENTIAL MAGNITUDE FOR UNDER-ESTIMATION OF RISK	POTENTIAL MAGNITUDE FOR OVER OR UNDER ESTIMATION OF RISK
Frequency of exposure to each medium	Medium		
Duration of exposure	Medium		
Soil ingestion rate			Low
Exposure to contaminants remaining constant over exposure period	Medium		
Exclusion of dermal exposure from Evaluation		Low	
Substituting maximum concentration as EPC	Medium		
Use of models to eliminate air exposure point concentrations			Medium
Body weight			Low
IV. Risk Characterization			
Risk additivity Carcinogens non-carcinogens			 Medium Medium

Nature and Extent of Contamination

The contaminants of concern in the various media at the MIG/DeWane landfill RI study area are as follows:

- Ambient air survey data indicate that VOCs and methane have been detected across the landfill surface at relatively low but variable concentrations.

- Gas probe results indicate the presence of 7 VOCs, in landfill gas at the landfill, at

concentrations greater than 1 ppmv, but less than 21 ppmv. The VOCS included chloroethane, acetone, 1,1-dichloroethane, 2-butanone, toluene, ethylbenzene, and xylenes. Eight other VOCs were detected in the gas at maximum concentrations between 0.5 ppmv and 1 ppmv. The 8 VOCs were vinyl chloride, methylene chloride, 1,1,1-trichloroethane, trichloroethene, benzene, tetrachloroethene, chlorobenzene, and cis-1,2-dichloroethene. Methane was detected in gas probe vapors at concentrations ranging from 10 percent to 50 percent of the total volume of landfill gas.

- Gas probe results for the 6 gas probes installed in March 1999 along the western edge of the landfill soil borrow pit indicate the presence of methane gas in 5 of the 6 gas probes. Readings from the 6 gas probes installed in the nearby subdivision ranged from 0 percent to 54 percent of the total volume of gas.

- Results from the leachate seep sediment sampling detected the presence of 8 VOCs and 13 Semi-VOCs (SVOCs). The VOCs include acetone, 2-butanone, toluene, and xylene with respective maximum concentrations of 13 ppm, 22 ppm, 5.2 ppm and 36 ppm. Also, the VOCs included methylene chloride, benzene, tetrachloroethene, and ethylbenzene which were detected with respective maximum concentrations of 12 ppm, 1.5 ppm, 2.1 ppm, and 4.5 ppm. The 13 SVOCs were detected in leachate seep sediment. Phenol and 4-methylphenol had respective maximum concentrations of 12 ppm and 76 ppm. Napthalene and phenanthrene were detected at concentrations of 1.2 ppm and 2.7 ppm, respectively. Nine other SVOCs were detected at concentrations below 1.0 ppm.

- Nine pesticides were detected at low concentrations in leachate seep sediment samples. Only two pesticides were detected at concentrations above .001 ppm or 10 ppb. Dieldrin was detected at a concentration of 11 ppb and methoxychlor was detected at 12 ppb.

- Four PCB compounds were detected at low concentrations in the leachate seep sediment samples. The maximum concentration of the detected PCBs was 180 ppb.

- The sample results from the RI detected in the leachate the presence of 13 inorganic compounds at concentrations above background surface water levels and regulatory groundwater standards.

- Soil sample results from the landfill area detected the presence of VOCs, Semi-VOCS, pesticides, PCBs, and inorganic compounds. All the VOCs detected in soil were also detected in leachate seep sediments; however, the concentrations in the soil were much lower than those detected in the sediment. Several VOCs were detected in soil that were not detected in sediment. Trace to low concentrations of organic and inorganic chemicals were detected in soil samples collected outside, but nearby, the landfill fence perimeter. The presence of low level pesticide concentrations detected outside the fenced perimeter are not attributed to the landfill, but to the surrounding agricultural land use.

- Residential well groundwater samples had no detectable concentrations of VOCs, Semi-VOCs, pesticides, or PCBs. The detected concentrations of inorganic chemicals in the residential well samples are typical of native groundwater and were not above any regulatory groundwater standards. Two of the residential wells did contain concentrations of nitrate/nitrite that were slightly above regulatory standard. The presence of nitrate/nitrite can be attributed to the application of fertilizers and the long history of farming activities that have occurred at these locations.

- Groundwater monitoring well samples detected concentrations of 6 VOCs, and 9 inorganic compounds that are believed to be attributable to the landfill and are at or above regulatory groundwater standards (see contaminants of concern, above). The VOCs are vinyl chloride, methylene chloride, 1,1-dichloroethene, 1,2-dichloropropane, trichloroethene, benzene, and tetrachloroethene. The inorganics are antimony, arsenic, chromium, iron, lead, manganese, mercury, nickel and boron.

- Surface water and surface water sediments samples were collected during three RI sampling rounds from four locations along the intermittent stream and from fifteen locations along the Kishwaukee River. There are no detected differences between surface water samples collected from the Kishwaukee River upstream, closest to, or downstream of the landfill.

Section 2: Exposure Assessment

The organic and inorganic contaminants identified at the landfill during the RI have several potential pathways by which people may be exposed, if no further remedial action would occur. The most pertinent pathways include direct contact, volatilization and wind dispersal, landfill gas, erosion and runoff, surface water, and groundwater.

- There is a potential for exposure to the contaminants onsite via direct contact with the landfill surface soil, landfill leachate via seeps and sediment, and surface impoundment liquid and sediment. There is also a potential for exposure to contaminants via direct contact with liquid and soil associated with the two intermittent drainage channels in the field located north of the landfill and the intermittent stream sediment and water. As noted in the baseline risk assessment, direct or dermal contact with the soil and water is not expected to be significant and was not evaluated at the site.

- There is a potential for exposure to the contaminants in landfill gas, soils, and sediments via the volatilization and wind pathway to individuals onsite and downwind.

- There is a potential for exposure to the contaminants via the landfill gas pathway to onsite workers who conduct subsurface activities and to offsite areas.

- Erosion and runoff comprise an intermediate transport pathway for contaminants to migrate from the landfill to the two intermittent drainage channels in the field located to the north of the landfill, to the former landfill borrow area south of the landfill, to the intermittent stream east of the landfill; and finally, to the Kishwaukee River.

- There is a potential for exposure to the contaminants via the surface water pathway. Since the Kishwaukee River is not used as a potable water source, the primary receptors for the surface water pathway are aquatic and terrestrial wildlife that come into contact with the waterway. The RI determined that the surface water pathway does not currently serve as an exposure pathway for landfill derived contaminants being transported to surface water receptors.

- The RI had identified two primary groundwater pathways. These groundwater pathways are referred to as the West Glacial Drift Pathway and the North Interface Pathway. Both of these groundwater pathways have no direct receptors since there are no current users of the impacted groundwater downgradient from the landfill and there is no realistic future potential for groundwater use due to institutional controls. Institutional controls such as zoning and health code regulations do not allow for building houses in the flood plain nor the placement of drinking water wells. The groundwater pathways do comprise an intermediate transport pathway for contaminants to migrate from the landfill to surface water pathways and to future residential indoor air pathways. An examination of the impact of VOCs migrating along the Western Glacial Drift pathway and then offgassing to future residential basement air was evaluated as part of the baseline risk assessment using conservative contaminant migration and attenuation assumptions. The baseline risk assessment estimated that there may be low part per billion concentrations of VOCs offgassing from the Western Glacial Drift groundwater.

The potential exposure to landfill gases has been addressed to an extent by the installation and start up of the landfill gas interceptor trench and gas extractions system.

Current and Potential Site Risks:

The baseline risk assessment characterizes contaminants and potential exposures in the absence of remediation in order to determine which risks need to be reduced or eliminated. Three human health exposure scenarios were evaluated: (1) child trespasser; (2) a current residential scenario, and (3) future residential scenario. Based on the exposure pathways evaluated in the baseline risk assessment, a significant risk to human health does exist at the site associated with following pathways: (1) acute exposures to the leachate surface impoundment; and (2) future chronic exposure to residents with homes near the borrow pit. These risks will be eliminated or severely minimized with the implementation of the remedial alternatives.

A critical exposure pathway for the trespasser is acute ingestion exposure of liquid and sediment